

REMARKS

The above amendments to the above-captioned application along with the following remarks are being submitted as a full and complete response to the Official Action dated August 16, 2002.

Claims 4-8 are under consideration in this application. Claims 1-3 are being cancelled without prejudice or disclaimer. Claim 4 is being amended, as set forth above and in the attached marked-up presentation of the claim amendments, in order to more particularly define and distinctly claim applicants' invention. Claims 5-8 are being added to recite other embodiments described in the specification which providing a plurality of biopolymer spots on one biochip or mass producing a plurality of biochips, etc. Applicants hereby submit that no new matter is being introduced into the application through the submission of this response.

In view of the above amendments and the following remarks, the Examiner is respectfully requested to give due reconsideration to this application, to indicate the allowability of the claims, and to pass this case to issue.

Translation of the Priority Document

Applicants hereby submit the verified translation of the Priority Document as enclosed.

Formality Rejection & Objection

The abstract was objected to for including two paragraphs and containing over 150 words. Applicant contend that the abstract now contains less than 150 words. The abstract has been amended into one paragraph as requested by the examiner.

Claim 4 has been rejected under 35 U.S.C. § 112, second paragraph, for being indefinite. As indicated, the claim has been amended as required to overcome the rejection. Accordingly, the withdrawal of the outstanding informality objections and rejections is in order, and is therefore respectfully solicited.

Prior Art Rejections

Claims 1, 2 and 4 were rejected under 35 U.S.C. § 102 as being anticipated by U.S. Pat. No. 6,365,378 to Hirota et al. (hereinafter "Hirota"), and claims 1, 2 and 3 were rejected under 35 U.S.C. § 102 as being anticipated by an specification of "GeneAmp DNA Amplification Regent Kit" by Perkin Elmer Cetus (hereinafter "Cetus"). Claim 4 is further rejected under 35 U.S.C. § 103 as being unpatentable over Perkin in view of U.S. Pat. No. 6,027,890 to Ness et al. (hereinafter "Ness").

As mentioned that claims 1-3 are being cancelled without prejudice or disclaimer, the relevant rejections thus become moot. The other rejections have been carefully considered, but are most respectfully traversed.

The process for producing at least one biochip of the invention, as now recited in claim 4, comprises: putting a first solution containing at least one biopolymer and a second solution which gravity is smaller than the gravity of the first solution so as not to mix with the first solution into an inkjet device; and injecting the first solution from the inkjet device to a substrate to immobilize the biopolymer on a spot of a substrate of said biochip.

Since Claim 4 is described in the translation of the Priority document (see [Means for Solving the Problem] in Abstract), claim 4 deserves the priority date of May 17, 2000. As such, Hirota which was filed on October 23, 2000 does not constitute a prior art reference.

Even assuming Hirota were a prior art reference, Applicants respectfully contend that neither Hirota nor the combined teachings of Cetus and Ness teach or suggest “placing two non-mixing solutions of different gravities in an inkjet device thereby injecting only the solution of the biopolymer with a bigger gravity on a bio-chip substrate” as the invention.

Contrary to the Examiner’s allegation that the description on col. 11, lines 20-40 teaches that the sample solution in Hirota containing two non-mixing solutions of different gravities, the cited language only describes the completion of the PCR, i.e., the presence of the PCR products, can be measured by the different gravity or viscosity of the PCR products from the source solution(s) by measuring a fluid characteristic or its changes, such as a resonance frequency or impedance of the fluid mixture of the PCR products and the residue of the source solution(s) (col. 4, lines 22-25; col. 11, lines 31-33). In other words, the solutions contained in the cavity are maintained mixed all the time. Hirota simply does not concerned about keeping two solutions of different gravities separated, much less about injecting only the solution of the biopolymer with a bigger gravity on a bio-chip substrate. As such, Applicant contend that one skilled in the art can not derive the conclusion of non-mixed solutions based upon the cited portion or any other portions of Hirota.

Even more, Hirota in fact teaches **mixing** and agitating the liquid charged in the cavity 56 to prepare the sample solution (col. 10, lines 36-37). It is well established that a rejection based on cited references having contradictory principles or principles that teach away from the invention is improper. Ness shares the same differences as Hirota in that it allows the concurrent presence of low concentrations of various other materials in combination of the biomolecule (col. 73, line 67 to col. 74, lines 2), i.e., a **mixture** of solutions which then are ejected from a inkjet print head onto the coating **altogether** (col. 75, lines 21-13) rather than just the solution of the biopolymer with a bigger gravity.

Regarding the proposed combination of Cetus and Ness, one skilled in the art simply will not be motivated to combine the oil overlay on the sample solution in the inkjet device in Ness for preventing evaporation with the teachings in Ness in the manner suggested by the Examiner since Ness does not concern any evaporation problem at all.

Further, the Examiner's reliance on "common knowledge and common sense" to teach the combination of the teachings of Cetus and Ness did not fulfill the agency's obligation to cite references to support its conclusions. Instead, the Examiner must provide the specific teaching of such a combination on the record to allow accountability.

To establish a prima facie case of obviousness, the Board must, inter alia, show "some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references." In re Fine, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). "The motivation, suggestion or teaching may come explicitly from statements in the prior art, the knowledge of one of ordinary skill in the art, or, in some cases the nature of the problem to be solved." Kotzab, 217 F.3d at 1370, 55 USPQ2d at 1317. Recently, in In re Lee, 277 F.3d 1338, 61 USPQ2d 1430 (Fed. Cir. 2002), we held that the Board's reliance on "common knowledge and common sense" did not fulfill the agency's obligation to cite references to support its conclusions. Id. at 1344, 61 USPQ2d at 1434. Instead, the Board must document its reasoning on the record to allow accountability. Id. at 1345, 61 USPQ2d at 1435.

See In re Thrift, 298 F.3d 1357.

Even if, arguendo, a person of ordinary skill were motivated to combine the teachings in Cetus and Ness, such combined teachings would still fall short in fully meeting the Applicants' claimed invention as set forth in claim 4 since, as discussed, since there is no teaching of "injecting only the solution of the biopolymer with a bigger gravity from the inkjet device onto a bio-chip substrate" in either Cetus or Ness. Cetus mentions nothing about injecting, and Ness injects a **mixture of solutions altogether** (col. 75, lines 21-13) rather than just the solution of the biopolymer with a bigger gravity.

As such, none of the cited prior art references or their combinations teach or disclose each and every feature of the present invention as disclosed in independent claim 4. As such, the present invention as now claimed is distinguishable and thereby allowable over the rejections raised in the Office Action. The withdrawal of the outstanding prior art rejections is in order, and is respectfully solicited.

In view of all the above, clear and distinct differences as discussed exist between the present invention as now claimed and the prior art reference upon which the rejections in the Office Action rely, Applicants respectfully contend that the prior art references cannot anticipate the present invention or render the present invention obvious. Rather, the present invention as a whole is distinguishable, and thereby allowable over the prior art.

Favorable reconsideration of this application is respectfully solicited. Should there be any outstanding issues requiring discussion that would further the prosecution and

allowance of the above-captioned application, the Examiner is invited to contact the Applicants' undersigned representative at the address and phone number indicated below.

Respectfully submitted,

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Marked-up Version of Amended Claims

4. A process for producing [a] at least one biochip, comprising:
 - putting a [biochip-producing] first solution containing [a] at least one biopolymer and a second solution which gravity is smaller than the gravity of the first solution so as not to mix with the first solution into an inkjet device; and
 - injecting the [biochip-producing] first solution from the inkjet device to a substrate to immobilize [a spot of] the biopolymer on a spot of a [the] substrate of said biochip[, wherein the biochip-producing solution is the solution according to any one of claims 1 to 3].

Mixed-up copy of abstract

ABSTRACT

The present invention aims at producing a biochip by an inkjet system without wasting a DNA solution. ↪

A biochip-producing solution is prepared to contain a combination of a DNA solution 6 to be spotted on a plate 5 and a low-cost buffer solution 7 to be remained in the device after the production. The buffer solution 7 used has a different specific gravity from that of the DNA solution 6 and thus is not mixed therewith.